4.5 PSP Cover Sheet (Attach to the front of each proposal)

Proposal Title: Real Time Water Quality Management
Applicant Name: Grassland Water District
Mailing Address: 22759 S. Mercey Springs Road, Los Banos, CA 93635
Telephone: (209) 826-5188
Fax: (209) 826-4984
Email: DKwasny@aol.com

Amount of funding requested: $ 652,330 for 3 years

Indicate the Topic for which you are applying (check only one box).

- ☐ Fish Passage/Fish Screens
- ☐ Habitat Restoration
- ☐ Local Watershed Stewardship
- ☒ Water Quality
- ☐ Introduced Species
- ☐ Fish Management/Hatchery
- ☐ Environmental Education

Does the proposal address a specified Focused Action? XX yes _____ no

What county or counties is the project located in? Merced

Indicate the geographic area of your proposal (check only one box):

- ☐ Sacramento River Mainstem
- ☐ Sacramento Trib: _____
- ☐ San Joaquin River Mainstem
- ☒ San Joaquin Trib: _____
- ☐ Delta: _____
- ☐ East Side Trib: _____
- ☐ Suisun Marsh and Bay
- ☐ North Bay/South Bay: _____
- ☐ Landscape (entire Bay-Delta watershed)
- ☐ Other: _____

Indicate the primary species which the proposal addresses (check all that apply):

- ☐ San Joaquin and East-side Delta tributaries fall-run chinook salmon
- ☐ Winter-run chinook salmon
- ☐ Late-fall run chinook salmon
- ☐ Delta smelt
- ☐ Splittail
- ☐ Green sturgeon
- ☒ Migratory birds
- ☐ Other: _____
- ☐ Spring-run chinook salmon
- ☐ Fall-run chinook salmon
- ☐ Longfin smelt
- ☐ Steelhead trout
- ☐ Striped bass
- ☐ All chinook species
- ☒ All anadromous salmonids

Specify the ERP strategic objective and target (s) that the project addresses. Include page numbers from January 1999 version of ERP Volume I and II:
Strategic plan goal 5, objective 6, page 478; the target is stage 1 expectations, page 479. Strategic Plan Goal 6, objective 1, page 506; second strategic plan goal 6, objective 2; third strategic plan goal 6, objective 3, page 507.

Target is stage 1 expectations, page 508.

Indicate the type of applicant (check only one box):

☐ State agency	☐ Federal agency
☐ Public/Non-profit joint venture	☐ Non-profit
☒ Local government/district	☐ Private party
☐ University	☐ Other: _____

Indicate the type of project (check only one box):

☐ Planning	☐ Implementation
☐ Monitoring	☐ Education
☒ Research	

By signing below, the applicant declares the following:

1.) The truthfulness of all representations in their proposal;

2.) The individual signing the form is entitled to submit the application on behalf of the applicant (if the applicant is an entity or organization); and

3.) The person submitting the application has read and understood the conflict of interest and confidentiality discussion in the PSP (Section 2.4) and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent as provided in the Section.

Grassland Water District by

Printed name of applicant

(Don Marciochi)

Signature of applicant

REAL-TIME WATER QUALITY MANAGEMENT

Adaptive real-time management of seasonal wetlands in the Grassland Water District to improve water quality in the San Joaquin River

Submitted by:

Grassland Water District (GWD)
22759 Mercey Springs Road
Los Banos, CA 93635

In cooperation with:

Lawrence Berkeley National Laboratory (LBNL)
Earth Sciences Division
1 Cyclotron Road
Berkeley, CA 94720

California Regional Water Quality Control Board (CRWQCB)
3443 Routier Road, Suite A
Sacramento, CA 95827-3098

California Department of Water Resources (DWR)
3251 S Street
Sacramento, CA 95816

US Bureau of Reclamation (USBR), GIS Center
2800 Cottage Way, MP-450
Sacramento, CA 95825

April 1, 1999

I. TITLE PAGE

FOCUS AREA: REAL-TIME WATER QUALITY MANAGEMENT

(a) Project Title Adaptive real-time management of seasonal wetlands in the Grassland Water District to improve water quality in the San Joaquin River

(b) Names of Principal Investigators

Dean Kwasny: (209) 826-5188
Grassland Water District
22759 Mercey Springs Road
Los Banos, CA 93635

Nigel Quinn: (510) 486-7056
Lawrence Berkeley National Laboratory
1 Cyclotron Road, 70A-3317K
Berkeley, CA 94720

Les Grober: (916) 255-3105
Reg. Water Quality Control Board
3443 Routier Road, Suite A,
Sacramento, CA 95827-3098

Earle Cummings: (916) 227-7519
Department of Water Resources
3251 S Street
Sacramento, CA 95816

(c) Type of Organization and Tax Status Grassland Water District formed under the California Water Code

(d) Tax Identification Number 94-2348958

(e) Technical Contact Person

Dr. Nigel W.T. Quinn
Lawrence Berkeley National Laboratory, 70A-3317K
1 Cyclotron Road, Berkeley, CA 94720
(510) 486-7056 : nwquinn@lbl.gov

(f) Financial Contact Person

Ms. Veronica Woodruff
Grassland Water District
22759 Mercey Springs Road
Los Banos, CA 93635
(209) 826-5188

(g) Participants/Collaborators in Implementation

GWD	LBNL	CRWQCB	USBR (GIS)
Scott Lower Don Marciochi Veronica Woodruff Dean Kwasny	Nigel Quinn	Les Grober	Tom Heinzer

II. EXECUTIVE SUMMARY

Project Title Adaptive real-time management of seasonal wetlands in the Grassland Water District to improve water quality in the San Joaquin River

Name of Applicants

Dean Kwasny	Wetland Biologist, Grassland Water District, (209) 826-5188, Dkwasny@aol.com
Nigel Quinn	Staff Geological Scientist, Lawrence Berkeley National Laboratory, (510) 486-7056, nwquinn@lbl.gov
Les Grober	Land and Water Use Analyst, Regional Water Quality Control Board, (916) 255-3105, lgrober@davis.com
Earle Cummings	Wetlands Coordinator, Department of Water Resources, (916) 227-7519 earlec@ca.water.gov,

Project Description

The Grassland Water District, together with the adjacent State and Federal refuges, constitutes the largest contiguous wetland in the State of California. Increases in water supply allocations under the Central Valley Project Improvement Act (CVPIA) are helping to improve the quality of wetland habitat in the Grassland Basin while increasing the quantity of water returned to the San Joaquin River during the spring months, when seasonal wetlands are drained. Seasonal wetland drainage may negatively impact agricultural operations in the South Delta during years when peak wetland return flows coincide with pre-irrigation of cropland because of the potential for elevated salinity in these return flows. This project proposes monitoring, modeling and adaptive management of field operations, in cooperation with the currently funded CALFED San Joaquin River Real-Time Water Quality Management Project, to coordinate seasonal wetland drainage with the assimilative capacity of the San Joaquin River.

Proposed scope of work (Tasks)

1. Design a monitoring system for measurement of wetland drainage flow and water quality parameters of concern (flow, EC, temperature).
   (a) Survey Grassland Water District's drainage system and document drainage hydrology.
   (b) Design flow structures and select water quality monitoring sensors at key monitoring sites.
   (c) Coordinate monitoring with other CALFED programs and the San Joaquin River Management Program (SJRMP) Water Quality Subcommittee.

2. Develop a multi-objective habitat evaluation and salinity management program to optimize wetland values and functions while minimizing water quality impacts on the San Joaquin River.
   (a) Establish study plots and describe wetland vegetation and traditional water requirements.
   (b) Develop survey techniques to assess wildlife use and vegetation response to experimental drawdowns.
   (c) Initiate experimental drawdowns and conduct field surveys of study plots.

3. Install, maintain and operate real-time EC, flow and temperature sensors in the project area.
   (a) Construct flow structures where necessary and install flow, EC and temperature sensors.
   (b) Implement a quality assurance/quality control and maintenance program.

(c) Perform seasonal mass balance analysis in Basin to ensure complete accounting of the Grassland Water District hydrology.

4. Develop a spreadsheet accounting model with a graphical user interface for estimation and forecasting of seasonal wetland salt loading to the San Joaquin River.
   (a) Develop analytical tools that assist in analysis of wetland water requirements and development of best management practices.
   (b) Develop user interface to interact with existing San Joaquin River water quality forecasting model to aid scheduling of wetland releases.

5. Perform adaptive management of wetland releases during spring 2000 and spring 2001 in cooperation with the SJRMP Water Quality Subcommittee.
   (a) Demonstrate the benefits of improved coordination and scheduling of return flows with the San Joaquin River Management Program.
   (b) Conduct workshops to demonstrate system use to Grassland Water District landowners, Grassland Task Force and adjacent State and Federal wildlife refuges.

Location

The Grassland Water District is a 50,000 acre area located to the north and south of the City of Los Banos, on the west side of the San Joaquin Valley (Attachment 1). The District is located within Merced County. The project area includes approximately 90 miles of wetland channels and is bound by the Main Canal and Delta Mendota Canal to the west and the San Luis Drain to the east. Wetland drainage from the Grassland Water District is conveyed to the San Joaquin River through either Mud Slough (north) or Salt Slough.

Applicant qualifications

The team members include Grassland Water District, LBNL, DWR and CRWQCB personnel all of whom have worked in the Grasslands Basin for more than a decade. The USBR Geographic Information Support Unit has a national reputation in the development of GIS-based modeling tools for project planning and analysis. Key personnel include:

GWD	LBNL	CRWQCB	DWR	USBR (GIS)
Dean Kwasny Don Marciochi Veronica Woodruff Scott Lower	Nigel Quinn	Les Grober	Earle Cummings	Tom Heinzer

Budget (three year duration)

Task	Direct Labor Hours	Direct Salary and Benefits	Service Contracts	Materials and Acquisition Costs	Misc. and Other Direct Costs	Overhead and Indirect Costs	Total Cost
Task 1	1,365	20,370	32,100	6,700		4,780	63,950
Task 2	9,180	89,780	8,180	7,500		21,040	126,500
Task 3	1,380	24,210	55,040	124,080		5,670	209,000
Task 4	4,805	49,800	71,460	6,700		11,670	139,630
Task 5	1,360	19,580	49,080	6,700		4,590	79,950
Project Mngt. Task	1,110	26,980				6,320	33,300
TOTAL	**19,200**	**230,720**	**215,860**	**151,680**		**54,070**	**652,330**

Monitoring and Data Evaluation
The monitoring and data gathering required for successful completion of this project will complement existing compliance monitoring programs including; the Grassland Bypass Project, routine monitoring performed by the CRWQCB and Grassland Water District, and the CALFED-sponsored "Real-Time San Joaquin River Water Quality Management" project, being undertaken by the SJRMP Water Quality Subcommittee.

Local Support/Coordination with Other Programs
The project will involve local landowners, duck club operators and managers of State and Federal refuges in the Grassland Basin. Although this pilot project will concentrate on the 50,000 acres that comprise the Grassland Water District, the goal of the project is to disseminate the findings of the project to the entire Grassland Ecological Area; a 160,000 acres wetland complex. The proposed project has local support from the County of Merced, Grassland Resource Conservation District, San Joaquin River Exchange Contractors Water Authority, and Drainage Coordinator for Grassland Area Farmers (Attachment 2).

This proposed project is part of a comprehensive proposal to establish a real-time monitoring and water quality forecasting system in the San Joaquin Basin including all the major east-side tributaries, the west-side agricultural water districts and the main stem of the San Joaquin River. The project will coordinate and supplement existing biological and water quality monitoring programs being conducted by the Grassland Water District to capitalize on increased water supply made available through the CVPIA.

Compatibility with CALFED Objectives
Salinity, selenium and temperature have been identified by the SJRMP Executive Council as water quality stressors of concern in the San Joaquin River. Management of wetland drainage discharges through scheduling of releases to coincide with periods of San Joaquin River assimilative capacity can help to improve San Joaquin River water quality. However, these actions may need to be tempered with consideration of the biological impacts of changes to traditional wetland management practices. No systematic data collection program has been undertaken to date to evaluate the short and long-term consequences of real-time wetland drainage management. Such a data collection program would create the foundation of an adaptive management strategy that could dovetail with current SJRMP and CALFED-sponsored initiatives on real-time quality management in the San Joaquin River and with the Vernalis Adaptive Management Program (VAMP), a multi-agency experiment to improve the San Joaquin River fishery through manipulation of tributary flows and flow release schedules.

III. PROJECT DESCRIPTION

Background

The Grassland Water District, together with the adjacent State and Federal refuges, constitutes the largest contiguous wetland in the State of California (Attachment 3). Over 26,000 acres of privately owned wetlands exist in the Grassland Water District alone. This figure does not include the numerous seasonal wetlands owned by federal refuges, state wildlife areas, and private landowners outside of the Grassland Water District that comprise the 160,000 acre Grassland Ecological Area.

Increases in water supply allocations under the Central Valley Project Improvement Act (CVPIA) are helping to improve the quality of wetland habitat in the Grassland Basin while increasing the quantity of water returned to the San Joaquin River during the spring months, when seasonal wetlands are drained. Seasonal wetland drainage may negatively impact agricultural operations in the South Delta during years when peak wetland return flows coincide with pre-irrigation of cropland because of the potential for elevated salinity in these return flows. The additional CVPIA water allocations, while increasing the flexibility of operation of seasonal wetlands and improving the quality of seasonal wetland habitat, potentially increases the salt load discharged to the San Joaquin River. Hence, exploitation of opportunities to improve coordination of seasonal wetland drainage with the assimilative capacity of the San Joaquin River for contaminants of concern are of considerable importance in complying with water quality objectives.

The elevated temperature of westside discharges to the San Joaquin River may affect the spawning success of salmonids. Improved scheduling of these discharges to avoid critical time periods for fish rearing will also help to remove an important stressor and improve the San Joaquin salmon fishery. The biological impacts of changing the timing of the fill and release cycles to correspond to periods of elevated San Joaquin River assimilative capacity for salt and selenium have not been documented. The proposed initiative offers a unique opportunity to develop an adaptive wetland and salinity management program in the upper watersheds of the western San Joaquin Basin that will directly complement the existing Vernalis Adaptive Management Program (VAMP). The goal of the VAMP is to monitor fishery impacts due to scheduled pulse flows and other east-side reservoir releases and to develop a long-term management plan for sustaining the San Joaquin River fishery.

We propose to implement a program of real-time monitoring and water quality management in the Grassland Water District to improve the coordination of wetland return flows to the San Joaquin River. Real-time temperature data will be gathered concurrently with flow, salinity and selenium concentration data from the Grassland Water District as input to the real-time water quality model of the San Joaquin River operated by the SJRMP Water Quality Subcommittee. CALFED has provided two years of grant support to the SJRMP Water Quality Subcommittee to enhance the existing network of real-time monitoring stations along the main-stem of the San Joaquin River and to improve the coordination of agricultural return flows and scheduled east-side fish flows. Installation of flow and water quality monitoring equipment and cellular telemetry equipment at key locations in the Grassland Water District will help to provide wetland and refuge managers with the data necessary to make scheduling decisions.

A program of wetland habitat assessment will proceed concurrently with the real-time monitoring and water quality management program. Changing the scheduling of wetland drainage to the San Joaquin River can affect the timing and rate of drawdown of wetland ponds and hence the forage value of the wetlands for migrating and wintering shorebirds and waterfowl. Wetland salinity

management measures can also affect the productivity and diversity of vegetation that can be grown in the watershed. The program would document the impacts of altering traditional wetland management practices and seek to develop guidelines for multi-objective wetland operations. The concurrent program of habitat evaluation and salinity management would lead to optimization of wildlife and environmental benefits to the Grassland Basin and San Joaquin River.

A GIS-based wetland habitat and salt accounting model will be developed for seasonal wetlands in the Grassland Water District to assist in the planning and scheduling of springtime drainage releases with weekly forecasts made by the SJRMP Water Quality Subcommittee. This model will incorporate the weekly water use requirements of seasonal wetlands in the Grassland Water District and the adjacent State and Federal refuges. Preliminary mapping of the wetland habitat in some of these areas has already been accomplished and digitized within the US Bureau of Reclamation's GIS system. The model will track salinity changes in each of the wetlands over the winter season and incorporate user-defined schedules for wetland drawdown in the spring months. By running scenarios of different monthly wetland fill and release schedules and annual changes in vegetation type, managers will be able to plan operations to minimize water quality impacts on the San Joaquin River while attempting to maximize wildlife benefits. Once fully developed and tested by Grassland Water District staff and project cooperators, this system of real-time monitoring stations and water quality accounting software will be demonstrated to State and Federal refuges within the Grasslands Basin in a number of technical workshops.

Proposed Scope of Work (Tasks)
The following tasks will be performed during the 3 year duration of the project:

1. Design a monitoring system for measurement of wetland drainage flow and water quality.
   (a) Survey Grassland Water District's drainage system and document drainage hydrology.
   (b) Design flow structures and select water quality monitoring sensors at key monitoring sites.
   (c) Coordinate monitoring with other CALFED programs and SJRMP Water Quality

2. Develop a multi-objective habitat evaluation and salinity management program to optimize wetland values and functions while minimizing water quality impacts on the San Joaquin River.
   (a) Establish study plots and describe wetland vegetation and traditional water requirements.
   (b) Develop survey techniques to assess wildlife use and vegetation response to experimental drawdowns.
   (c) Initiate experimental drawdowns and conduct field surveys of study plots.

3. Install, maintain and operate real-time EC, flow and temperature sensors in the project area.
   (a) Construct flow structures where necessary and install flow, EC and temperature sensors.
   (b) Implement a quality assurance/quality control and maintenance program.
   (c) Perform seasonal mass balance analysis in Basin to ensure complete accounting of the Grassland Water District hydrology.

4. Develop a spreadsheet accounting model with a graphical user interface for estimation and forecasting of seasonal wetland salt loading to the San Joaquin River.
   (a) Develop analytical tools that assist in analysis of wetland water requirements and development of best management practices.

(b) Develop user interface to interact with existing San Joaquin River water quality forecasting model to aid scheduling of wetland releases.

5. Perform adaptive management of wetland releases during spring 2000 and spring 2001 in cooperation with the SJRMP Water Quality Subcommittee.
   (a) Demonstrate the benefits of improved coordination and scheduling of return flows with San Joaquin River Management Program.
   (b) Conduct workshops to demonstrate system use to Grassland Water District landowners, Grassland Task Force and adjacent State and Federal wildlife refuges.

Location of Project

The Grassland Water District is a 50,000 acre area to the north and south of the City of Los Banos, on the west side of the San Joaquin Valley (Attachment 1). The Grassland Water District is located within Merced County. The project area includes approximately 90 miles of wetland channels and is bound by the Main Canal and Delta Mendota Canal to the west and the San Luis Drain to the east. Wetland drainage from the Grassland Water District is conveyed to the San Joaquin River through either Mud Slough (north) or Salt Slough.

IV. ECOLOGICAL/BIOLOGICAL BENEFITS

Seasonal wetlands in the Grassland Water District are flooded in the fall and drawn-down in the spring to provide habitat for migratory waterfowl, shorebirds, and other wetland-dependent wildlife. Due to alterations in natural hydrology, these wetlands are flooded with Central Valley Project water supplies delivered from GWD canals. In the spring, during the months of March-April, seasonal wetlands are drawn-down to mimic the natural dry cycle of a seasonal wetland. Wetland draw-downs are timed to make seed and invertebrate resources available during peak waterfowl and shorebird migrations and to correspond with optimal germination conditions (primarily soil temperature) to grow naturally occurring moist-soil plants. The seeds of moist-soil plants are recognized as a critical waterfowl food source, providing essential nutrients and energy for wintering and migrating birds (Fredrickson and Taylor 1982).

Spring releases of water from seasonal wetlands are discharged into tributaries of the Lower San Joaquin River. These releases, in combination with agricultural drainage that flows through the Grassland Water District, contain varying amounts of total dissolved solids (TDS), boron, and selenium. These constituents have been identified as stressors that lead to frequent exceedance of water quality objectives established for the San Joaquin River by state and federal agencies.

Research conducted by Grober et al. (1995) suggests that wetland drainage could be scheduled to coincide with peak assimilative capacity in the San Joaquin River to help improve downstream water quality. In addition, increased water supply allocations under the Central Valley Project Improvement Act (CVPIA) have created opportunities to coordinate the release of seasonal wetland drainage with the assimilative capacity of the San Joaquin River. Coordinated releases will help to achieve salt and boron water quality objectives and improve fish habitat in the main stem of the San Joaquin River and Sacramento - San Joaquin Delta. Improved scheduling of west-side discharges can assist in avoiding critical time periods for fish rearing and remove an important stressor leading to improvements in the San Joaquin salmon fishery. To date, however, no systematic data collection program has been undertaken to evaluate the short and long-term consequences of real-time wetland drainage management.

Management of wetland drainage through scheduling of releases to coincide with periods of San Joaquin River assimilative capacity can help to improve San Joaquin River water quality. However, these actions may need to be tempered with consideration of the biological impacts of changes to traditional wetland management practices. Peak assimilative capacity typically occurs between the months of January and March. This time period is earlier than the traditional wetland draw-down period (March-April). In particular, the response of migratory waterfowl and shorebirds to an early draw-down regime needs to be assessed to determine potential impacts to foraging rates, habitat availability, and species diversity and abundance. It is possible that early, experimental drawdown may make food sources available to wildlife without negatively affecting wetland vegetation community and plant species diversity - hence benefiting both wildlife and the San Joaquin River. This project should have considerable technology transfer value to other agencies that manage seasonal wetlands and also discharge constituents of concern to the River.

Linkages

The data collection suggested as part of this proposal is consistent with the current CALFED-sponsored initiative on real-time water quality management in the San Joaquin River and with the Vernalis Adaptive Management Program. The linkage of this proposal and the CALFED focus action that concentrates on the main-stem of the San Joaquin River is shown in Attachment 4. Other linked projects are:

1. Coordinated Regional Management Program (CRMP). CRMP objectives are to reduce contaminant loading and sediment erosion produced by ephemeral rainfall runoff events in the Panoche Creek Watershed. Salt and selenium generated by Panoche-Silver Creek affects the assimilative capacity of the San Joaquin River for salt and selenium.
2. Grassland Bypass Project. This project limits monthly selenium loads from the Grassland agricultural water districts and hence affects the assimilative capacity of the San Joaquin River for salt, selenium and boron.

System Wide Ecosystem Benefits

The proposed project will provide basic monitoring information and will develop decision support tools to allow wetland managers in the Grassland Water District to respond to the long-term challenge of improving water quality while maximizing wetland functions and habitat values. Information obtained through this project will be transferable and of significant value to all wetlands in the Grassland Ecological Area including those managed by duck clubs, California Department of Fish and Game, and U.S. Fish and Wildlife Service (USFWS). The successful implementation of this combined monitoring, experimentation, and evaluation program will provide the basis for adaptive management of wetland drainage throughout the Grassland Ecological Area; a 160,000 acre wetland ecosystem officially recognized by the USFWS.

Compatibility with Non-Ecosystem Objectives

The proposed project is a key component of an expanded San Joaquin River real-time forecasting project, initially supported by the U.S. Bureau of Reclamation under a Challenge Grant and more recently funded by CALFED. The CALFED San Joaquin River Real-Time Water Quality Management Project uses telemetered stream stage and salinity data and computer models to simulate and forecast water quality conditions along the lower SJR. The decision support tools being used in the existing CALFED project are applicable to the proposed project since the data derived from wetland monitoring sites will feed directly into the existing SJRIODAY model to help

improve the accuracy of west-side water quality forecasts. At the present time the SJRIODAY forecasting model relies on historic patterns of wetland release in estimating Mud Slough flow, salinity and boron loads.

The monitoring and data gathering required for successful completion of the proposed wetland management project will also complement existing compliance monitoring program being undertaken by the cooperating agencies in the Grasslands Bypass Project and the routine monitoring performed by the CRWQCB and Grassland Water District.

V. TECHNICAL FEASIBILITY AND TIMING

An initial trial of the concept of real-time coordination of seasonal wetland releases with San Joaquin River assimilative capacity, as proposed in this application, was performed during January 1995 (Grober et al. 1995). The Grassland Water District, with the recent acquisition of supplemental water supplies under the Central Valley Project Improvement Act, sought to make an early release of ponded water to reduce the likelihood of downstream salinity impacts and salinity objective violations in the San Joaquin River later in the season. The Water District requested that the SJRMP-WQS provide a forecast of the most advantageous time to make this release. A model forecast, made on January 15, 1995 suggested that the combination of high river flows and an imminent rainstorm might provide the necessary assimilative capacity. The peak wetland release was timed so that it would coincide with the peak flow in the San Joaquin River. Wetland flushing began on January 18 and ended on February 19, with the peak wetland discharge occurring on January 27. Assimilative capacity was positive in the River throughout the simulation period owing to the rainfall-runoff events in the upper watershed. No violations of the EC objective occurred during the trial period and there were no EC violations in the San Joaquin River during March and April, 1996.

The 1995 demonstration was performed without the benefit of the basic monitoring information and decision support tools proposed in this application that will allow wetland managers to respond to San Joaquin River discharge opportunities while maximizing wetland functions and habitat value.

VI. MONITORING AND DATA COLLECTION METHODOLOGY

Activities of these and other monitoring and adaptive management programs will be coordinated through the San Joaquin River Management Program. Data will be freely exchanged between the participating agencies, providing accurate and timely information for making forecasts of salinity on the San Joaquin River.

Biological/Ecological Objectives

The biological and ecological monitoring and data objectives of the project are as follows:

1. Document the effects of changing traditional flood-up and wetland drainage discharge patterns on wetland vegetation and bird species.
2. Measure the impact of changes in wetland operations and timing on water quality in the San Joaquin River. Run model simulations to compare with and without-action scenarios.
3. Develop an adaptive management approach to optimize wetland habitat and maximize water quality benefits in the San Joaquin River.

Monitoring Parameters and Data Collection Approach

Wetland Drainage Assessment
The water quality parameters monitored in wetlands and wetland drainage channels include the following:

salinity (EC) - continuous
selenium, boron (monthly grab samples to supplement current sampling program)
temperature

Flow sensors will be placed at control structures within the District and will measure stage using either pressure transducer technology. Each site will be rated using standard USGS flow rating techniques as described in the Quality Assurance Project Plan of the Grassland Bypass project (USBR, 1997) in order to compute discharge from stage. Records will be kept of weir board height so as to account for any changes in the station rating if weir boards are removed for flood operations or to deal with some other emergency situation. A temperature-compensated electrical conductivity sensor will be used to obtain real-time salinity and temperature data. Each of these sites will have telemetry equipment installed to allow data to be accessed and downloaded from the Grassland Water District office. Monthly servicing of the site will be performed, in accordance with the Quality Assurance Plan to ensure data reliability.

Wetland Vegetation and Waterbird Use Assessment
The vegetation and waterbird use measurements made in representative seasonal wetlands include:

Biological measurements will be taken on adjacent traditionally and non-traditionally drained wetlands and will include: determining waterfowl and shorebird (waterbird) abundance and diversity using scan-sampling methodology with a variable power spotting scope, determining time-activity budgets of waterbirds through direct observation to assess foraging potential, and determining moist-soil plant production by conducting vegetation surveys to assess plant biomass, cover, and species composition.

Wetland monitoring sites will be randomly chosen from available seasonal wetlands within the Grassland Water District. These wetlands will correspondingly drain into locations where flow and EC monitoring sites are situated. At all wetland study plots, a paired study design will be used to directly assess differences in traditionally drained wetlands vs. non-traditionally drained wetlands.

Data Evaluation Approach
Data gathered following the manipulation of the timing of wetland flood-up and release during each year of the project will be analyzed and evaluated to determine the biological impacts to seasonal wetland habitat quality using vegetative production (food availability) and waterbird use. These impacts will be contrasted with the benefits to San Joaquin River water quality achieved through discharging drainage from seasonal wetlands during periods of assimilative capacity for salt and trace elements of concern such as boron and selenium. The effect of experimental early drawdowns of wetlands on water quality the San Joaquin River will be measured and compared by modeling the effects of a no-action scenario. The SJRIODAY Model (the same model used by the SJRMP-WQS in the CALFED San Joaquin Water Quality Management Project) will used to estimate salinity impacts on the river and the EC at Vernalis without the action. The SJRMP-WQS has shown that

the model is a reliable predictive tool, when provided with appropriate west-side and east site tributary flows and loads at all monitoring locations.

Flow and water quality data from real-time monitoring stations within the Grassland Water District will be compiled and daily mean values of flow and contaminant concentrations determined. Daily contaminant loads will be calculated from the daily mean values and these numbers will be compared with daily assimilative capacity determinations, made using data available from the monitoring stations operated by the CALFED-sponsored Real-Time Water Quality Management Project on the main-stem of the San Joaquin River. Wetland discharge opportunities will be evaluated weekly by Quinn, Grober and Cummings of the Project team. Coordination between the proposed project and the existing CALFED- funded San Joaquin River Project is critical to the success of this project. Quinn and Grober are currently involved in the latter project and will ensure that this coordination takes place. Data collected at the Grassland Water District sites will be summarized and reported annually.

Representative wetland study sites will be chosen within the Grassland Water District to alter the scheduling of wetland drainage to conform to project objectives. These same wetland areas will be part of the adaptive management experiment for the duration of the project. Biological data will be entered into a spread-sheet program and analyzed using p.c. statistical software such as SAS or NCSS. Null hypotheses of no net change to wetland habitat quality and function will be tested statistically using a paired t-test analysis. Provided the statistical assumptions of the test are met, data will be combined for all years. If not, data will be analyzed on an annual basis.

Table 2. Monitoring and Data Collection Information

BIOLOGICAL/ECOLOGICAL OBJECTIVES		
Hypothesis/Question to be Evaluated	Monitoring Parameter(s) and Data Collection Approach	Data Evaluation Approach
1. How much drainage flow, salinity (EC), selenium, and boron is being released to the San Joaquin River as a result of wetland drainage (drawdown)?	Collect information on flow, temperature, salinity (EC), selenium, and boron using flow sensors	Perform seasonal mass balance analysis to determine the quantity of these constituents being released into the San Joaquin River.
2. Does altering the schedule of wetland drawdown, to coincide with peak assimilative capacity, result in a net improvement in water quality to the San Joaquin River?	Collect data on flow, temp., salinity (EC), selenium, and boron in wetland channels. Coordinate information with monitoring efforts of the CALFED San Joaquin Real-Time Water Quality Management Study to estimate River assimilative capacity and determine water quality.	Computation of daily mean flow and EC. Coordination with CALFED San Joaquin Real-Time Water Quality Management Study to estimate River assimilative capacity and determine opportunities for wetland discharge.

3. Does altering the schedule of wetland drawdown impact wetland vegetation production and habitat availability and use by migratory waterbirds?	Collect data on waterbird use, abundance and diversity on experimental and control wetlands. Collect vegetation data to determine moist-soil plant production on experimental and control wetlands.	Analyze data using NCSS or SAS statistical programs using a paired t-test design. Determine if altering traditional drawdown timing impacts the value of seasonal wetlands as habitat for migratory waterbirds.

VII. LOCAL INVOLVEMENT

The County of Merced has been notified (Attachment 5) and fully supports the project's effort to assess the coordination of wetland drainage to improve water quality in the San Joaquin River (Attachment 2). In addition, the project has the support of the Grassland Resource Conservation District, San Joaquin River Exchange Contractors Water Authority and the Drainage Coordinator for Grassland Area Farmers, all of these groups are actively involved and committed to the improvement of water quality in the San Joaquin River (Attachment 2).

This project will involve local landowners, duck club operators and managers of State and Federal refuges in the Grassland Ecological Area. Although this pilot project will concentrate on the 50,000 acres that comprise the Grassland Water District, the goal of the project is to disseminate the findings to wetland managers in the entire 160,000 acre Grassland Ecological Area. Public resource agencies, such as the California Department of Fish and Game and the U.S. Fish and Wildlife Service are aware of the project and are supportive of this research effort.

The Grassland Water District has a successful history of local involvement through the District newsletter, published monthly; as well as, through annual District landowner meetings and wetland habitat management workshops. Findings from this project will be disseminated to local landowners, duck club managers, state and federal resource agencies, and the County of Merced via the newsletter and through these annual meetings. Futhermore, the results of this project will be submitted to appropriate peer-review journals and information will be exchanged at annual wildlife and water quality conference and workshops, such as those held by the Wildlife Society.

VIII. COSTS AND SCHEDULE TO IMPLEMENT PROPOSED PROJECT

The proposed project will have a three year duration with planning and installation of the flow and EC monitoring system occurring during year 1, the development of a wetland habitat water needs and salt accounting model during year 2, and the field coordination of wetland flows by the SJRMP Water Quality subcommittee in both years 1, 2 and 3 of the proposed project. Procedures for the evaluation of the effects of drainage scheduling on wetland vegetation and waterbird use will be refined during the first 6 months of the project and will be implemented during the project's three year term.

The work schedule is shown in the table below. Two progress reports and one final project report will be prepared summarizing the objectives accomplished during the year and results from monitoring activities in the Water District. A number of workshops will be conducted to assist potential users of the computer software developed as part of this proposed project in accessing data from the monitoring system, determining habitat water requirements, planning drainage release

schedules and developing long-term best management practices for seasonal wetlands within the Water District.

Table 3. Budget (Oct 1, 1999 - Sept 30, 2002)

Task	Direct Labor Hours	Direct Salary and Benefits	Service Contracts	Materials and Acquisition Costs	Misc. and Other Direct Costs	Overhead and Indirect Costs	Total Cost
Task 1	1,365	20,370	32,100	6,700		4,780	63,950
Task 2	9,180	89,780	8,180	7,500		21,040	126,500
Task 3	1,380	24,210	55,040	124,080		5,670	209,000
Task 4	4,805	49,800	71,460	6,700		11,670	139,630
Task 5	1,360	19,580	49,080	6,700		4,590	79,950
Project Mngt. Task	1,110	26,980				6,320	33,300
TOTAL	**19,200**	**230,720**	**215,860**	**151,680**		**54,070**	**652,330**

Table 4. Quarterly Budget

FY2000

Task	Oct-Dec 99	Jan-Mar 00	Apr-Jun 00	Jul-Sep 00	Oct-Dec 00	Total Budget
Task 1	35,330	28,620				63,950
Task 2	11,100	12,600	16,000	10,800	3,000	53,500
Task 3		152,500	28,250	28,250		209,000
Task 4			16,200	28,500	28,500	73,200
Task 5		8,400	20,500	6,500		35,400
Project Mngt.	2,500	1,800	1,800	1,800	1,800	9,700
TOTAL	**48,930**	**203,920**	**82,750**	**75,850**	**33,300**	**444,750**

FY2001

Task	Jan-Mar 01	Apr-Jun 01	Jul-Sep 01	Oct-Dec 01	Total Budget
Task 1					
Task 2	12,600	16,000	10,800	3,000	42,400
Task 3					
Task 4	28,500	28,500	9,430		66,430
Task 5	8,400	20,500	6,500		35,400
Project Mngt.	7,300	1,800	1,800	1,800	12,700
TOTAL	**56,800**	**66,800**	**28,530**	**4,800**	**156,930**

FY2002

Task	Jan-Mar 02	Apr-Jun 02	Jul-Sep 02	Total Budget
Task 1				
Task 2	12,600	16,000	2,000	30,600
Task 3				
Task 4				
Task 5			9,150	9,150
Project Mngt.	1,800	1,800	7,300	10,900
TOTAL	**14,400**	**17,800**	**18,450**	**50,650**

Schedule

Oct 1 1999- Sept 30, 2000	Construction of flow monitoring stations Installation of sensors, telemetry equipment Water quality data acquisition and entry GIS-based model development and testing
Jan 1, 2000 - Jun 1, 2000	Forecasting and management of first-year wetland drainage including the collection of water quality data and biological data
Jun 1, 2000 - Dec 30, 2000	Progress report and refinement of model
Jan 1, 2001 - Jun 1, 2001	Forecasting and management of second-year wetland drainage including the collection of water quality data and biological data
Jun 1, 2001 - Dec 30, 2001	Progress report and refinement of model
Jan 1, 2002 - Jun 1, 2002	Forecasting and management of third-year wetland drainage including the collection of water quality data and biological data
Jun 1, 2002 - Sept 30, 2002	Final report, workshops and demonstrations of real-time management system to State and Federal Refuges.

IX. COST SHARING

A total of $10,000 (over the three year period) has been committed from the U.S. Bureau of Reclamation Mid Pacific GIS Service group to survey and document the drainage hydrology and land use of the Grassland Water District. The USBR will be digitizing land use coverages within the project area of the San Joaquin Basin Action Plan that will be used in the project for habitat delineation and estimation of water requirements and return flows in the proposed project. Delineation of areas outside the Grassland Resource Conservation Area but within the hydrologic basin are important to separate flows and salt loads under direct control of the Grassland Water District from those flows and salt loads contributed by State and Federal wetlands. Mr. Tom Heinzer from the MPGIS Service Center will be the USBR cooperator on this project. Mr Heinzer will also assist in the linkage of ARCVIEW and the EXCEL-based water supply and drainage mass-balance model. Mr. Heinzer is a recognized expert on ARC-INFO modeling.

The Department of Water Resources has committed $54,600 (over the three year period) to assist in coordination of the proposed project with the CALFED-sponsored Real-Time Water Quality Management Project in the San Joaquin River. Mr. Earle Cummings (DWR) is the wetland coordinator for the Departmant of Water Resources, as well as, the chair of the San Joaquin River Management Program Water Quality Subcommittee. As a wetland biologist and owner of a private duck club in the Sacramento Valley, Earle Cummings will assist Dean Kwasny of the Grassland Water District with wetland habitat management on the project and the interpretation of data related to the impacts of water and drainage management on wetland habitat quality.

X. APPLICANT QUALIFICATIONS

The team members include Grassland Water District staff, LBNL, DWR and CRWQCB personnel, all of whom have worked in the Grasslands Basin for more than a decade. Scott Lower and Don Marchioci understand the complex plumbing of the flow and drainage distribution system in the District, knowledge that is essential for the development of a monitoring plan and salinity accounting model. Nigel Quinn and Les Grober both have extensive modeling backgrounds and have been working together and independently on selenium fate and transport experiments in the District for the past 5 years. Earle Cummings is Wetlands Coordinator for the Department of Water Resources and the owner of a private duck club. The USBR Geographic Information Support Unit has a national reputation in the development of GIS-based modeling tools for project planning and analysis and has already developed many of the base coverages for the Grasslands basin that will be used in this project .

Don Marciochi (General Manager, Grassland Water District)

Don Marciochi has been employed by the Grassland Water District since October 1973 and has served as the District's General Manager since 1983. He led the District's efforts to secure a firm water supply by active participation in the development of the refuge provisions of CVPIA and similarly was involved in bringing about the implementation of projects to remove selenium contaminated drainwater from the District's water supply. Don has a degree in history from California State University in Fresno.

Dean Kwasny (Wetland Biologist, Grassland Water District)

Graduated from Humbold State University with a BS and MS in wildlife management. Worked for the California Department of Fish and Game for five years managing wetland habitats and for Ducks Unlimited as a waterfowl and wetlands biologist. Now with the Grassland Water District working with private landowners to enhance wetlands for the benefit of wildlife. Assistsing wetland managers with water conservation practices, habitat management and project development.

Scott Lower (Water Superintendent, Grassland Water District)

Scott Lower is the water master for the Grassland Water District where he has worked since 1983. Scott's duties at the Water District involve managing the water distribution system within Grassland Water District, accounting for water deliveries to Water District contractors and overseeing the District's monitoring program. He previously owned his own printing business for 8 years prior to working for the Water District. Scott earned a BA degree in Graphic Arts from San Jose State University in San Jose, California and has an AA degree from Cabrillo Junior College.

Nigel Quinn (Geological Scientist, Lawrence Berkeley National Laboratory)

Nigel Quinn received a BSc (Hons) in irrigation engineering and hydrology from the Cranfield Institute of Technology in England and spent the early part of his career as an irrigation engineer for Tate and Lyle Inc. designing and troubleshooting irrigation systems in England and in Africa. He left England for Iowa in 1978 where he taught agricultural water management, rural water supply engineering and surveying courses for three years, earning an MS in Agricultural and Civil Engineering and conducting research in soil erosion under crop canopy. In 1981 he took a position

at Cornell University where he worked on various projects ranging from earthworm vermicomposting, pesticide model development and water supply and sanitation policy in developing countries, co-taught classes in surveying and computer programming and earned a PhD in civil and environmental engineering in 1987. He then joined the San Joaquin Valley Drainage Program, retaining a faculty affiliation with Cornell, and took responsibility for development of groundwater and drainage models to support the Drainage Program's planning effort. With the sunset of the Drainage Program he has continued his work with the US Bureau of Reclamation dividing his time between monitoring efforts in support of the Grasslands Bypass project, development of real-time forecasting tools for the San Joaquin River and selenium fate and transport research projects. He has been affiliated with Lawrence Berkeley National Laboratory for the past 6 years. Nigel is the author of over 50 publications and reports on various aspects of water resources and drainage engineering.

Leslie Grober (CRWQCB-CVR Associate Land and Water Use Analyst)

Leslie Grober's duties and responsibilities with the CRWQCB are as follows : (1) run the forecasting model and review DWR's forecasting model results, (2) supervise staff conducting water quality sampling described under Task 3, (3) participate in workshops to solicit interest and participation by stakeholders in Program activities, and (4) assist in the documentation of Program activities and accomplishments on the Internet through the future SJRMP home page and through annual hard-copy status reports to CALFED.

Leslie Grober has earned a B.S. in Geology, a M.S. in Hydrologic Science, and is currently pursuing a Ph.D. in Hydrologic Science from the University of California, Davis. He has extensive background in hydrologic, hydraulic, and water quality modeling. He currently provides flow and water quality monitoring support for the CRWQCB program that monitors agricultural discharges in the SJR Basin, updates and maintains the San Joaquin River Input Output (SJRIO) water quality model, and provides modeling support to state and local agencies to evaluate the impact of management strategies on SJR water quality (e.g., to the SJRMP Water Quality subcommittee for the SJR Real-time Water Quality Management Demonstration Project and to the SWRCB to evaluate programmatic alternatives in the SWRCB's draft Environmental Impact Report to implement requirements in the 1995 Bay-Delta Plan.)

Earle Cummings (Wetland Coordinator, Department of Water Resources)

Wetlands Coordinator, and Recreation and Wildlife Resources Advisor in the Environmental Services Office for the Department of Water Resources since April 1997. Technical training in chemistry, biological sciences, hydrology and wildlife ecology. Employment in the chemical industry, non-profits, academia, local government and several State natural resource management and regulatory agencies. Recent accomplishments include coordinating the Department of Water Resources' Urban Streams Restoration Program and working as relief supervisor of the Flood Information Center during the January 1997 floods. Responsible for selecting and administering grant contracts leading to completion of over 150 stream restoration projects statewide. Chairs the San Joaquin River Management Program Action Team Water Quality Subcommittee. Co-instructs the DWR training classes Employee Environmental Liability and Environmental Awareness.

Tom Heinzer (Consulting GIS Analyst, U.S. Bureau of Reclamation)

Tom Heinzer earned a B.S. Chemical Engineering from U.C. Berkeley in 1982 and has worked for USBR in different capacities for 13 years. He transferred to the GIS project (MPGIS) in 1986, where he was responsible for application development and analysis, and remains so to this day. During the last several years, Tom has worked extensively to develop techniques to interface GIS software to environmental models. Although most of his research has focused water modeling, specifically 1 and 2-D hydrodynamic models (DAMBRK, IGSM, MIKE21, others), and ground water models (mainly MODFLOW), he has also been involved in other types of modeling such as visibility analysis, allocation, terrain and archeological site prediction.

Veronica Woodruff (Executive Secretary / Office Manager / Treasurer, Grassland Water District)

Veronica Woodruff currently fills multiple roles in the Grassland Water District as Executive Secretary, Office Manager and Treasurer and has worked with the District since 1989. She attended Merced Junior College and has gained the majority of her skills through on-the-job training together with a number of computer training, software and programming courses. Veronica has a strong background in data processing.

REFERENCES

Fredrickson, L.H. and T.S. Taylor. 1982. Management of seasonally flooded impoundments for wildlife. Resource Publication 148. U.S. Dept. of the Interior, Fish and Wildlife Service, Washington, D.C.

Grober, L.F., J. Karkoski, and T. Poole. 1995. Water quality impact of wetlands on San Joaquin River, California, paper no. 00149 *In* T.G. Cleveland [ed.], Advances in the development and use of models in water resources: Proceedings of the American Water Resources Association held in Houston, Texas, November 5-10, 1995. Dept. of Civil and Environmental Engineering, University of Houston, Houston, TX

Karkoski J., N.W.T. Quinn, L.F.Grober, J.E. Chilcott, A. Vargas. 1995. Selenium transport in the Grasslands watershed. Poster session. Selenium in the Environment: Essential Nutrient, Potential Toxicant. Cooperative Extension and U.C. Veterinary Medical Extension Conference, June 1,2 1995, Sacramento.

Karkoski J., N.W.T. Quinn, L.F. Grober. 1995. The potential for real-time water quality management in the San Joaquin River Basin of California. Advances in Model Use and Development for Water Resources. AWRA Annual Conference and Symposium Proceedings, Houston, Texas, July.

Quinn N.W.T., C.W. Chen, L.F. Grober, J. Kipps and E. Cummings. 1997. Computer model improves real-time management of water quality. California Agriculture, Vol. 51, No. 5.

Quinn N.W.T. and J. Karkoski. 1998. Potential for real time management of water quality in the San Joaquin Basin, California. American Water Resources Association, Vol 34, No. 6.

Quinn N.W.T., and M.L. Delamore, 1994. Issues of sustainable irrigated agriculture in the San Joaquin Valley of California in a changing regulatory environment concerning water quality and protection of wildlife. International Symposium on Water Resources in a Changing World, Karlsruhe, Germany, June 1994.

Quinn N.W.T., J.C. McGahan and M.L. Delamore, 1994. Innovative strategies reduce selenium in Grasslands drainage. California Agriculture, Vol. 52, No. 5.

Quinn, N.W.T., T. Tokunaga, J. Clyde and R. Salve, 1994. Investigation of selenium losses in canals used for conveyance of sub-surface agricultural drainage in the western San Joaquin Valley, California. Proceedings of the International Conference on Groundwater Ecology Atlanta, Georgia.

Williams, O.E. 1996. Waterbird responses to late winter and early spring drawdowns of moist-soil managed wetlands in California's San Joaquin Valley. M.S. thesis, Humboldt State University. 136 pages

Attachment 1.

Grassland Water District Location Maps

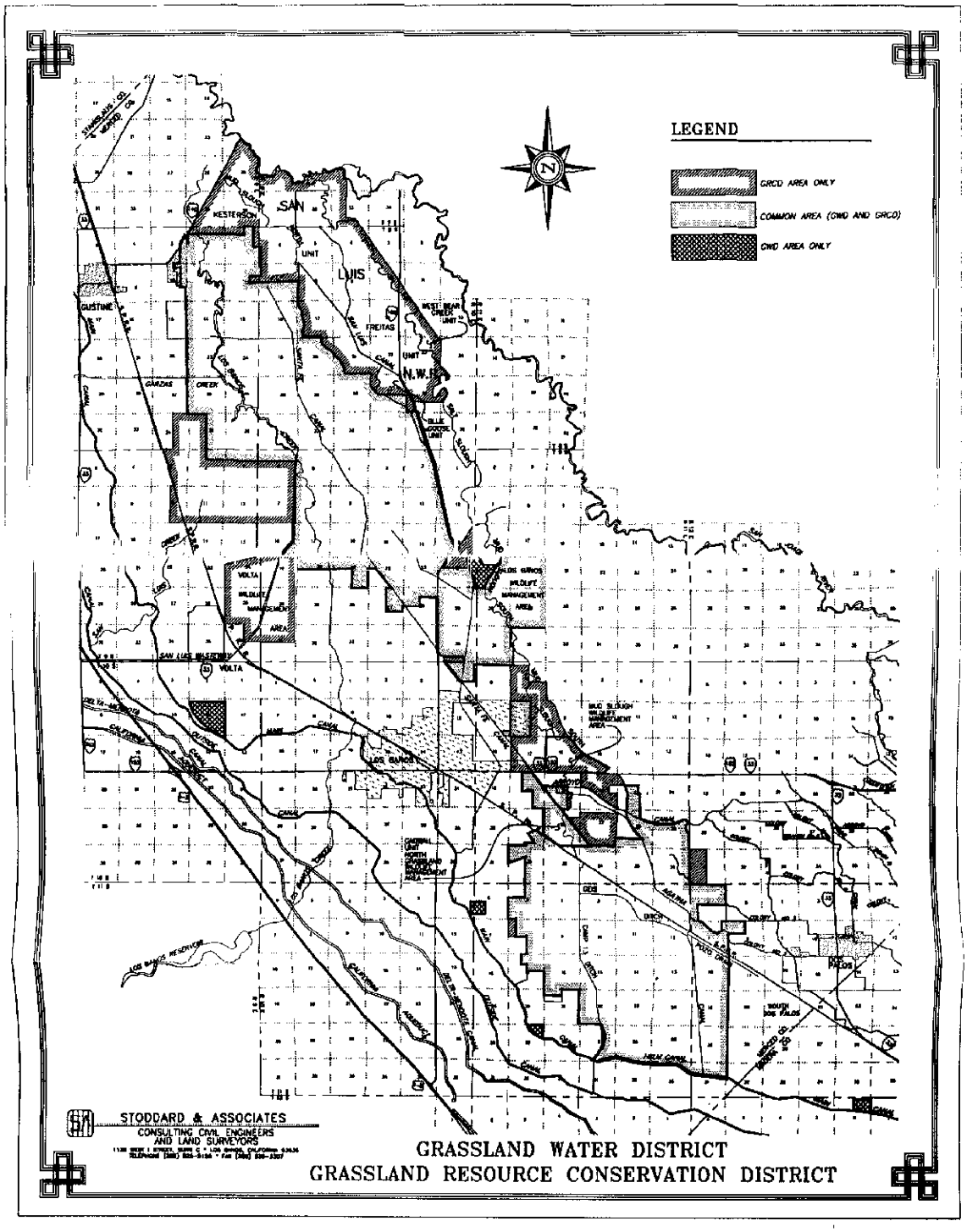
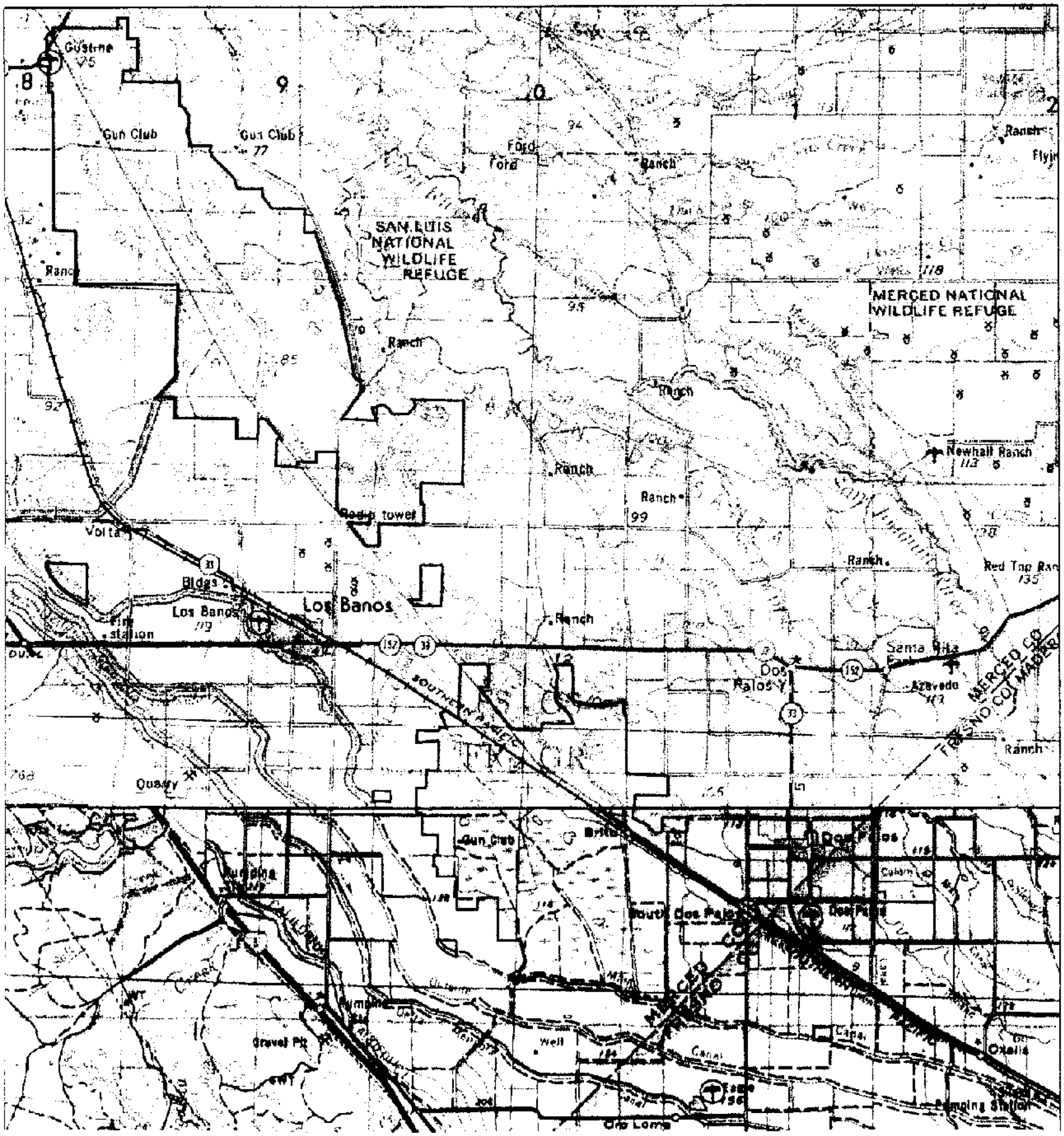


FIGURE 1. LOCATION MAP


Gustine
Gun Club
SAN LUIS NATIONAL WILDLIFE REFUGE
MERCED NATIONAL WILDLIFE REFUGE
Ranch
Newhall Ranch
Radio tower
Volta
Los Banos
Fire station
Quarry
Dos Palos Y
Santa Rita Park
Azevedo
Red Top Ranch
Gun Club
Dos Palos
South Dos Palos
Gravel Pit
Well
Oxalis
Pumping Station
Oro Loma

Attachment 2.

Letters of Support

MERCED COUNTY

BOARD OF SUPERVISORS

2222 'M' STREET● MERCED, CALIFORNIA 95340 ● TELEPHONE (209) 385-7366 ●FAX NO. (209) 726-7977

GLORIA CORTEZ KEENE	KATHLEEN M. CROOKHAM	JOE RIVERO	DEIDRE F. KELSEY	JERRY O'BANION	GREGORY B. WELLMAN
First District	Second District	Third District	Fourth District	Fifth District	Clerk
Merced	Merced	Atwater	Snelling	Dos Palos	

April 13, 1999

Mr. Don Marciochi
General Manager
Grassland Water District
22759 S. Mercey Springs Road
Los Banos, CA 93635

Dear Mr. Marciochi:

The Grassland Water District (GWD) in cooperation with Lawrence Berkeley National Laboratory, the California Regional Water Quality Control Board, the California Department of Water Resources and the U.S. Bureau of Reclamation is submitting a proposal for a Real-Time Water Quality Management Project.

The project proposes to implement a program of real-time monitoring and water management within the GWD to improve the coordination of return flows. The project has the potential to improve the San Joaquin River water quality by timing wetland discharges to coincide with peak river flows.

The Merced County Board of Supervisors supports the project proposal and the efforts of the Grassland Water District to improve water quality.

Sincerely,

Deidre F. Kelsey

Deidre F. Kelsey
Chairman, Board of Supervisors

AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER

I —0 1 8 3 9 2

Grassland Resource Conservation District
22759 S. Mercey Springs Rd.
Los Banos, CA 93635
Telephone (209) 826-5188
Fax (209) 826-4984

April 5, 1999

Mr. Don Marciochi, General Manager
Grassland Water District
22759 S. Mercey Springs Rd
Los Banos, CA 93635

RE: CALFED Proposal – Adaptive real-time management of seasonal wetlands in the Grasslands Water District to improve water quality in the San Joaquin River

The Grassland Resource Conservation District fully supports the goals outlined in the Grassland Water District's CALFED grant proposal entitled *Adaptive real-time management of seasonal wetlands in the Grasslands Water District to improve water quality in the San Joaquin River*. We believe the information provided by this project will be of significant benefit in understanding the effects of wetland drainage on water quality in the San Joaquin River. In addition, the project offers an excellent opportunity to demonstrate the commitment from both environmental water users, as well as agricultural water users, to help alleviate potential water quality impacts in the San Joaquin River watershed.

Once again, we are in complete support of the project and strongly urge CALFED to fund the project. If we can be of any assistance in making this project a success, please notify us.

Sincerely,

Duane Cosart
GRCD President

SAN JOAQUIN RIVER
EXCHANGE CONTRACTORS WATER AUTHORITY

Consisting of 240,000 acres on the Westside of the San Joaquin Valley

P. O. Box 2115
836 6th Street
Los Banos, California
93635
(209) 827-8616
Fax (209) 827-9703

April 12, 1999

Mr. Don Marciochi, General Manager
Grassland Water District
22759 S. Mercy Springs Road
Los Banos, CA 93635

RE: Adaptive real-time management of seasonal wetlands in the Grassland Water District to improve water quality in the San Joaquin River

Dear Don Marciochi:

As you are aware, the San Joaquin River Exchange Contractors Water Authority (Authority) is a Joint Powers Authority that represents four member agencies: the Central California Irrigation District, the Columbia Canal Company, the Firebaugh Canal Water District and the San Luis Canal Company. The Authority consists of approximately 240,000 acres on the Westside of the San Joaquin Valley with an annual water supply of 840,000 acre-feet in which we produce over 75 different crops with an estimated Farm level output of over $380 million annually.

The Authority encompasses most of the Grassland Water District (GWD) and has enjoyed an excellent long-standing working relationship with it. The Authority has received and reviewed the GWD's Real-Time Water Quality Management proposal and we vigorously support it. Management of water quality in the San Joaquin River has been and continues to be an issue of paramount importance. Water Quality is being closely monitored by the State Water Resources Control Board , the Regional Water Quality Control Board, the U. S. Bureau of Reclamation and various local agencies including the Authority.

The GWD proposal includes most of the agencies mentioned above as co-participants and therefore has, in our opinion, the right agencies involved to make this a viable project. The Authority is also a participant in the San Joaquin River Agreement (a.k.a. VAMP) and water quality and flow from the GWD and the local refuges was a concern throughout the negotiations. This proposal, if implemented, would be a tremendous benefit to those involved in San Joaquin River Agreement and its implementation.

Again, the Authority is in full support of your Real Time Water Quality Managemant proposal and would like to assist you in any way possible.

Sincerely,

Steve Chedester
Executive Director

cc: Member Agencies

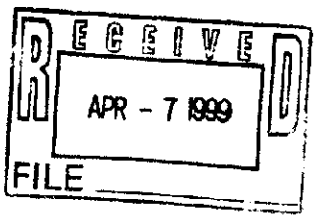
SUMMERS ENGINEERING, INC.
CONSULTING ENGINEERS

JOSEPH B. SUMMERS
JOSEPH C. McGAHAN
ROGER L. REYNOLDS
BRIAN J. SKAGGS
SCOTT L. JACOBSON

887 N. IRWIN ST. - P. O. BOX 1122
HANFORD, CALIFORNIA 93232

Note new area code →

TELEPHONE
(559) 582-9237
TELECOPIER
(559) 582-7632



April 6, 1999

Don Marciochi
Grassland Water District
22759 South Mercey Springs Road
Los Banos, CA 93635

SUBJECT: Adaptive Real-Time Management of Seasonal Wetlands in the Grassland Water District to Improve Water Quality in the San Joaquin River

Dear Don:

We have reviewed your application dated April 1, 1999 for the Real-Time Water Quality Management Project. We feel that this is a very necessary piece in the puzzle to provide better management of water quality in the San Joaquin River. It is an addition to the SJRMP Real-Time Management Program and to the operation and monitoring of the Grassland Bypass project. We would like to be kept up to date and coordinate with monitoring for the Grassland Bypass Project to determine the most efficient use of this real-time information. We therefore support the granting of the funds from the CALFED Program for this Real-Time Water Quality Management Project.

Very truly yours,

Joseph C. McGahan
Drainage Coordinator for the Grassland Area Farmers

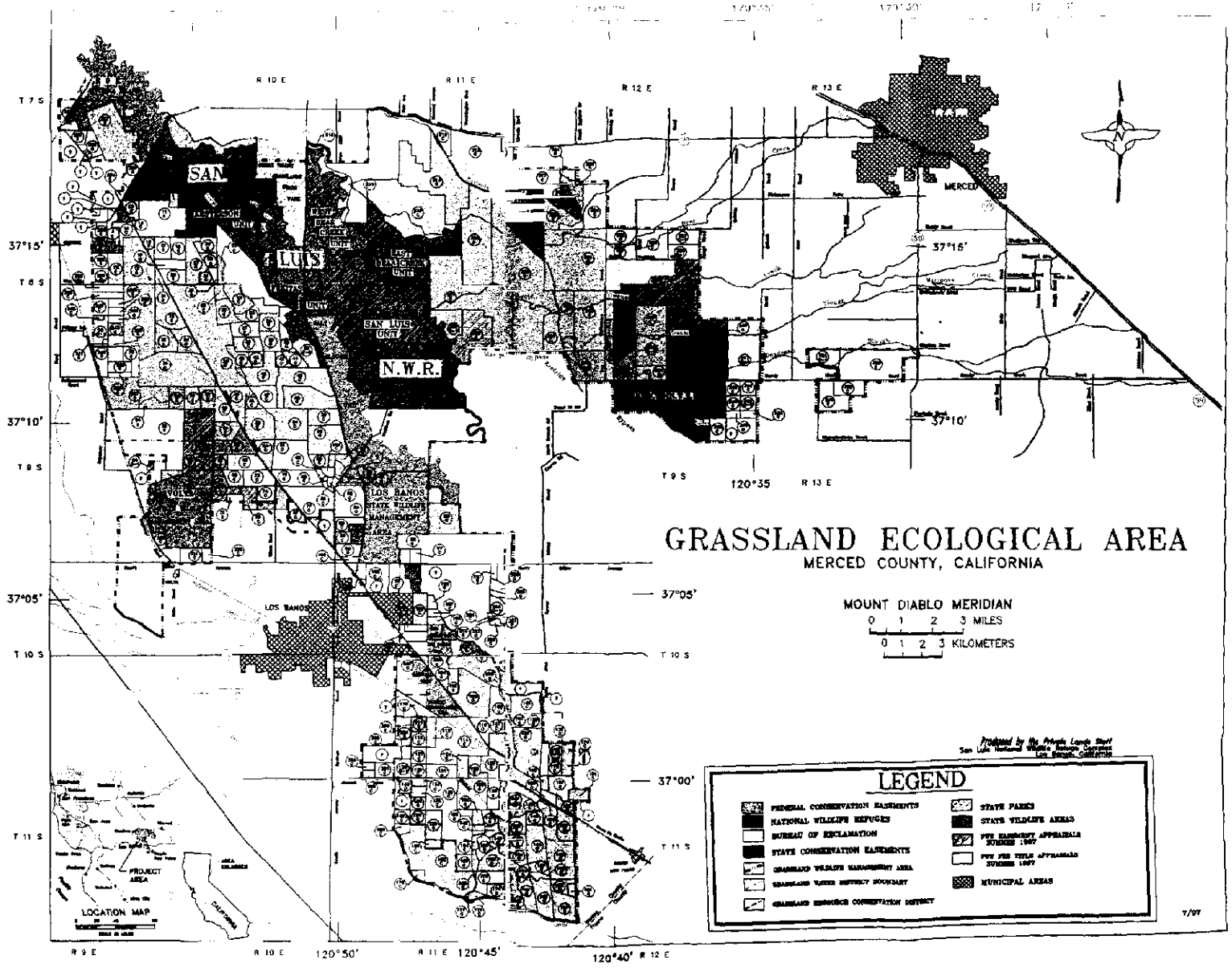
JCM/p

I-018396

Attachment 3.

Grassland Ecological Area Map

I-018397



I-018398

Attachment 4.

Linkage Map of Proposed Project with Related CALFED Projects

I-018399

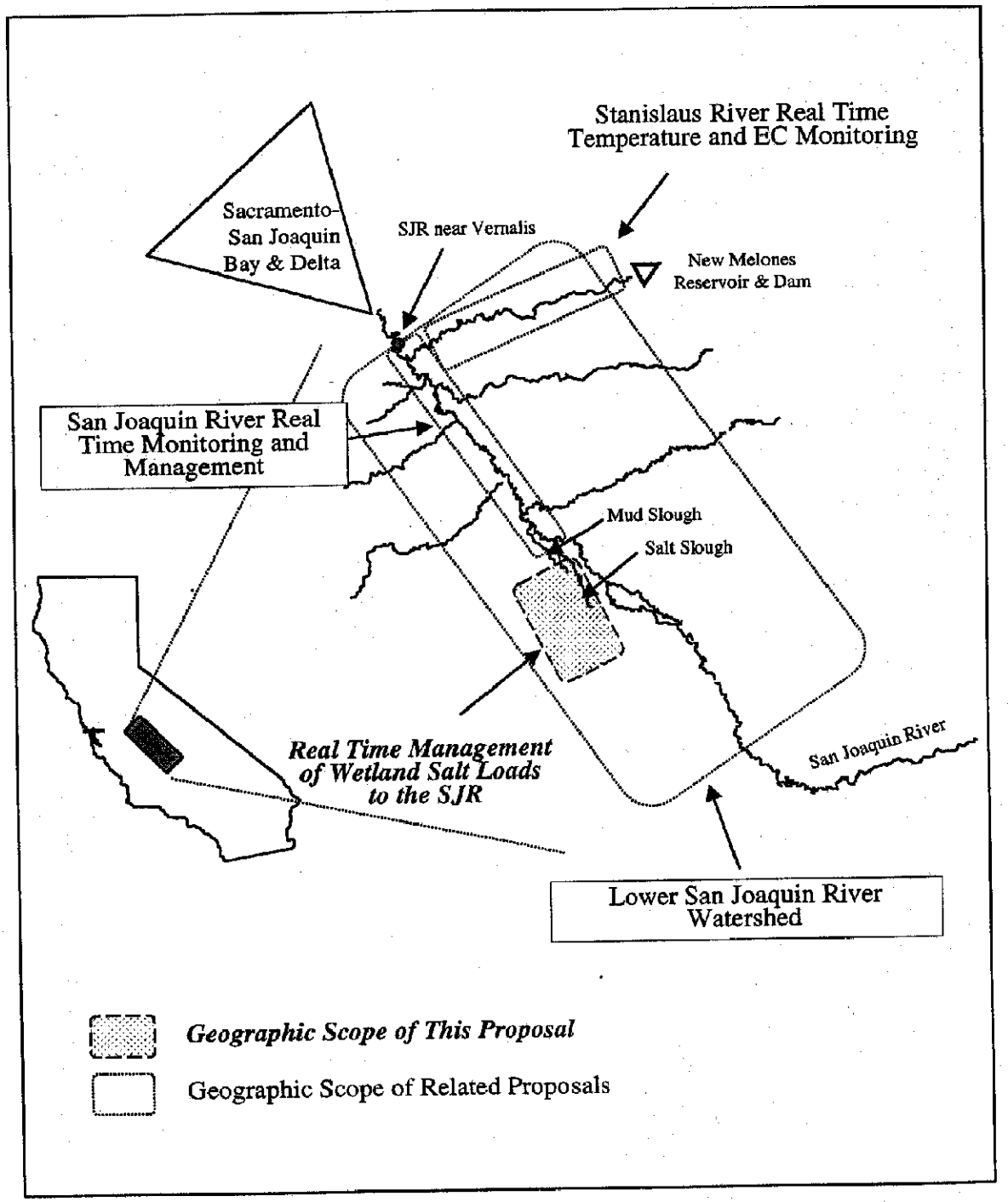


Figure AXX.1 Geographic Scope of Related CALFED Project Proposals

Attachment 5.

Project Notification Letter to the County of Merced

Grassland Water District

22759 S. Mercey Springs Road
Los Banos, CA 93635
Telephone (209) 826-5188
Fax (209) 826-4984

March 26, 1999

Supervisor Jerry O'Banion
Merced County Board of Supervisors
District 5
County Administration Building
2222 "M" Street
Merced, CA 95340

Dear Mr. O'Banion:

Enclosed is a copy of a proposal to be submitted to CALFED for a Real-Time Water Quality Management project as developed by the Grassland Water District (GWD) in cooperation with Lawrence Berkeley National Laboratory, the California Regional Water Quality Control Board, the California Department of Water Resources and the U.S. Bureau of Reclamation.

The project proposes to implement a program of real-time monitoring and water management within the GWD to improve the coordination of return flows from GWD wetlands with the assimilative capacity of the San Joaquin River. By timing wetland discharges to coincide with peak River flows the project has the potential to improve San Joaquin River water quality.

I would welcome the opportunity to meet with you and/or other representatives of the County as you deem appropriate to discuss our proposal in detail. In the interim please contact me if you have any questions or need additional information.

Sincerely,

Don Marciochi
General Manager

DM:mc

Enclosure

U.S. Department of the Interior

Certifications Regarding Debarment, Suspension and Other Responsibility Matters, Drug-Free Workplace Requirements and Lobbying

Persons signing this form should refer to the regulations referenced below for complete instructions:

Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions - **The prospective primary participant further agrees by submitting this proposal that it will include the clause titled, "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions. See below for language to be used; use this form for certification and sign; or use Department of the Interior Form 1954 (DI-1954). (See Appendix A of Subpart D of 43 CFR Part 12.)**

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions - (See Appendix B of Subpart D of 43 CFR Part 12.)

Certification Regarding Drug-Free Workplace Requirements - Alternate I. (Grantees Other Than Individuals) and Alternate II. (Grantees Who are Individuals) - (See Appendix C of Subpart D of 43 CFR Part 12)

Signature on this form provides for compliance with certification requirements under 43 CFR Parts 12 and 18. **The certifications shall be treated as a material representation of fact upon which reliance will be placed when the Department of the Interior determines to award the covered transaction, grant, cooperative agreement or loan.**

PART A: Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions

---

CHECK__ IF THIS CERTIFICATION IS FOR A PRIMARY COVERED TRANSACTION AND IS APPLICABLE.

(1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

PART B: Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions

---

CHECK__ IF THIS CERTIFICATION IS FOR A LOWER TIER COVERED TRANSACTION AND IS APPLICABLE.

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

06-2010
March 1997
[illegible] 06-1953, 06-1954, 06-1955, 06-1956 and 06-1963

PART C: Certification Regarding Drug-Free Workplace Requirements

CHECK X IF THIS CERTIFICATION IS FOR AN APPLICANT WHO IS NOT AN INDIVIDUAL.

Alternate I. (Grantees Other Than Individuals)

A. The grantee certifies that it will or continue to provide a drug-free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;

(b) Establishing an ongoing drug-free awareness program to inform employees about--
(1) The dangers of drug abuse in the workplace;
(2) The grantee's policy of maintaining a drug-free workplace;
(3) Any available drug counseling, rehabilitation, and employee assistance programs; and
(4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;

(c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);

(d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will --
(1) Abide by the terms of the statement; and
(2) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;

(e) Notifying the agency in writing, within ten calendar days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position title, to every grant officer on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification numbers(s) of each affected grant;

(f) Taking one of the following actions, within 30 calendar days of receiving notice under subparagraph (d)(2), with respect to any employee who is so convicted --
(1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended; or
(2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;

(g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a) (b), (c), (d), (e) and (f).

B. The grantee may insert in the space provided below the site(s for the performance of work done in connection with the specific grant:

Place of Performance (Street address, city, county, state, zip code)

Grassland Water District, 22759 S. Mercey Springs Rd., Merced County, CA 93635

Check___if there are workplaces on file that are not identified here.

PART D: Certification Regarding Drug-Free Workplace Requirements

CHECK__IF THIS CERTIFICATION IS FOR AN APPLICANT WHO IS AN INDIVIDUAL.

Alternate II. (Grantees Who Are Individuals)

(a) The grantee certifies that, as a condition of the grant, he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity with the grant;

(b) If convicted of a criminal drug offense resulting from a violation occurring during the conduct of any grant activity, he or she will report the conviction, in writing, within 10 calendar days of the conviction, to the grant officer or other designee, unless the Federal agency designates a central point for the receipt of such notices. When notice is made to such a central point, it shall include the identification number(s) of each affected grant

PART E: **Certification Regarding Lobbying**
Certification for Contracts, Grants, Loans, and Cooperative Agreements

CHECK X IF CERTIFICATION IS FOR THE AWARD OF ANY OF THE FOLLOWING AND THE AMOUNT EXCEEDS $100,000: A FEDERAL GRANT OR COOPERATIVE AGREEMENT; SUBCONTRACT, OR SUBGRANT UNDER THE GRANT OR COOPERATIVE AGREEMENT.

CHECK __ IF CERTIFICATION IS FOR THE AWARD OF A FEDERAL LOAN EXCEEDING THE AMOUNT OF $150,000, OR A SUBGRANT OR SUBCONTRACT EXCEEDING $100,000, UNDER THE LOAN.

The undersigned certifies, to the best of his or her knowledge and belief, that:

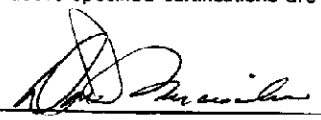
(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

As the authorized certifying official, I hereby certify that the above specified certifications are true.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL 

TYPED NAME AND TITLE Don Marciochi, General Manager

DATE 4/15/99

APPLICATION FOR FEDERAL ASSISTANCE

OMB Approval No. 0348-0043

2. DATE SUBMITTED: 4/16/99		Applicant Identifier: N/A	
1. TYPE OF SUBMISSION: Application ☐ Construction ☒ Non-Construction; Preapplication ☐ Construction ☐ Non-Construction		3. DATE RECEIVED BY STATE: N/A	State Application Identifier: N/A
		4. DATE RECEIVED BY FEDERAL AGENCY:	Federal Identifier:

5. APPLICANT INFORMATION

Legal Name: Grassland Water District

Organizational Unit:

Address *(give city, county, State, and zip code)*: 22759 S. Mercey Springs Rd. Los Banos, Merced Co., CA, 93635

Name and telephone number of person to be contacted on matters involving this application *(give area code)*: Don Marciochi (209) 826-5188

6. EMPLOYER IDENTIFICATION NUMBER *(EIN)*: 94-2348958

7. TYPE OF APPLICANT: *(enter appropriate letter in box)*: G

A. State; B. County; C. Municipal; D. Township; E. Interstate; F. Intermunicipal; G. Special District; H. Independent School Dist.; I. State Controlled Institution of Higher Learning; J. Private University; K. Indian Tribe; L. Individual; M. Profit Organization; N. Other (Specify) _____

8. TYPE OF APPLICATION: ☒ New ☐ Continuation ☐ Revision

If Revision, enter appropriate letter(s) in box(es): ☐ ☐

A. Increase Award B. Decrease Award C. Increase Duration D. Decrease Duration Other *(specify)*: _____

9. NAME OF FEDERAL AGENCY: Unknown at this time

10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: ☐☐-☐☐☐

TITLE: N/A

11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT: Adaptive Real-Time Management of Seasonal Wetlands in the Grassland Water District to improve water quality in the San Joaquin River.

12. AREAS AFFECTED BY PROJECT *(Cities, Counties, States, etc.)*: Merced County, CA

13. PROPOSED PROJECT: Start Date 10/01/99; Ending Date 9/30/02

14. CONGRESSIONAL DISTRICTS OF: a. Applicant District 18 (Condit); b. Project District 18 (Condit)

15. ESTIMATED FUNDING:

a. Federal	$ 652,330 .00
b. Applicant	$ .00
c. State	$ 54,600 .00
d. Local	$ .00
e. Other	$ .00
f. Program Income	$ .00
g. TOTAL	$ 706,930 .00

16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?

a. YES. THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON: DATE _____

b. No. ☒ PROGRAM IS NOT COVERED BY E. O. 12372 ☐ OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW

17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT? ☐ Yes If "Yes," attach an explanation. ☒ No

18. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT, THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED.

a. Type Name of Authorized Representative	b. Title	c. Telephone Number
Don Marciochi	General Manager	(209) 826-5188

d. Signature of Authorized Representative: Don Marciochi

e. Date Signed: 4/15/99

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Standard Form 424 (Rev. 7-97)
Prescribed by OMB Circular A-102

I -018406

I-018406

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

This is a standard form used by applicants as a required facesheet for preapplications and applications submitted for Federal assistance. It will be used by Federal agencies to obtain applicant certification that States which have established a review and comment procedure in response to Executive Order 12372 and have selected the program to be included in their process, have been given an opportunity to review the applicant's submission.

Item:	Entry:
1.	Self-explanatory.
2.	Date application submitted to Federal agency (or State if applicable) and applicant's control number (if applicable).
3.	State use only (if applicable).
4.	If this application is to continue or revise an existing award, enter present Federal identifier number. If for a new project, leave blank.
5.	Legal name of applicant, name of primary organizational unit which will undertake the assistance activity, complete address of the applicant, and name and telephone number of the person to contact on matters related to this application.
6.	Enter Employer Identification Number (EIN) as assigned by the Internal Revenue Service.
7.	Enter the appropriate letter in the space provided.
8.	Check appropriate box and enter appropriate letter(s) in the space(s) provided: -- "New" means a new assistance award. -- "Continuation" means an extension for an additional funding/budget period for a project with a projected completion date. -- "Revision" means any change in the Federal Government's financial obligation or contingent liability from an existing obligation.
9.	Name of Federal agency from which assistance is being requested with this application.
10.	Use the Catalog of Federal Domestic Assistance number and title of the program under which assistance is requested.
11.	Enter a brief descriptive title of the project. If more than one program is involved, you should append an explanation on a separate sheet. If appropriate (e.g., construction or real property projects), attach a map showing project location. For preapplications, use a separate sheet to provide a summary description of this project.

Item:	Entry:
12.	List only the largest political entities affected (e.g., State, counties, cities).
13.	Self-explanatory.
14.	List the applicant's Congressional District and any District(s) affected by the program or project.
15.	Amount requested or to be contributed during the first funding/budget period by each contributor. Value of in-kind contributions should be included on appropriate lines as applicable. If the action will result in a dollar change to an existing award, indicate *only* the amount of the change. For decreases, enclose the amounts in parentheses. If both basic and supplemental amounts are included, show breakdown on an attached sheet. For multiple program funding, use totals and show breakdown using same categories as item 15.
16.	Applicants should contact the State Single Point of Contact (SPOC) for Federal Executive Order 12372 to determine whether the application is subject to the State intergovernmental review process.
17.	This question applies to the applicant organization, not the person who signs as the authorized representative. Categories of debt include delinquent audit disallowances, loans and taxes.
18.	To be signed by the authorized representative of the applicant. A copy of the governing body's authorization for you to sign this application as official representative must be on file in the applicant's office. (Certain Federal agencies may require that this authorization be submitted as part of the application.)

OMB Approval No. 0348-0044

BUDGET INFORMATION - Non-Construction Programs

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Real Time Water		$	$	$ 411,450	$ 18,200	$ 429,650
2. Quality Management						
3. CALFED						
4.						
5 Totals		$	$	$ 411,450	$ 18,200	$ 429,650

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY (1)	(2)	(3)	(4)	Total (5)
a. Personnel	$	$	$	$	$
b. Fringe Benefits					
c. Travel					
d. Equipment					
e. Supplies					
f. Contractual					
g. Construction					
h. Other					
i. Total Direct Charges (sum of 6a-6h)					
j. Indirect Charges					
k. TOTALS (sum of 6i and 6j)	$	$	$	$	$
7. Program Income	$	$	$	$	$

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Standard Form 424A (Rev. 4-92)
Prescribed by OMB Circular A-102

I—018408

I-018408

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS
8.	$	$	$	$
9.				
10.				
11.				
12. TOTAL (sum of lines 8 - 11)	$	$	$	$

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 411,450	$ 48,930	$ 203,920	$ 82,750	$ 75,850
14. NonFederal	18,200	4,550	4,550	4,550	4,550
15. TOTAL (sum of lines 13 and 14)	429,650	53,480	208,470	87,300	80,400

(a) Grant Program	FUTURE FUNDING PERIODS (Years) (b) First	(c) Second	(d) Third	(e) Fourth
16.	$ 185,430	$ 55,450	$	$
17.				
18.				
19.				
20. TOTAL (sum of lines 16-19)	$ 185,430	$ 55,450	$	$

21. Direct Charges:	22. Indirect Charges:
23. Remarks:	

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Standard Form 424A (Rev. 4-92) Page 2

I—018409

I-018409

General Instructions

This form is designed so that application can be made for funds from one or more grant programs. In preparing the budget, adhere to any existing Federal grantor agency guidelines which prescribe how and whether budgeted amounts should be separately shown for different functions or activities within the program. For some programs, grantor agencies may require budgets to be separately shown by function or activity. For other programs, grantor agencies may require a breakdown by function or activity. Sections A, B, C, and D should include budget estimates for the whole project except when applying for assistance which requires Federal authorization in annual or other funding period increments. In the latter case, Sections A, B, C, and D should provide the budget for the first budget period (usually a year) and Section E should present the need for Federal assistance in the subsequent budget periods. All applications should contain a breakdown by the object class categories shown in Lines a-k of Section B.

Section A. Budget Summary Lines 1-4 Columns (a) and (b)

For applications pertaining to a *single* Federal grant program (Federal Domestic Assistance Catalog number) and *not requiring* a functional or activity breakdown, enter on Line 1 under Column (a) the catalog program title and the catalog number in Column (b).

For applications pertaining to a *single* program *requiring* budget amounts by multiple functions or activities, enter the name of each activity or function on each line in Column (a), and enter the catalog number in Column (b). For applications pertaining to multiple programs where none of the programs require a breakdown by function or activity, enter the catalog program title on each line in *Column* (a) and the respective catalog number on each line in Column (b).

For applications pertaining to a *multiple* programs where one or more programs *require* a breakdown by function or activity, prepare a separate sheet for each program requiring the breakdown. Additional sheets should be used when one form does not provide adequate space for all breakdown of data required. However, when more than one sheet is used, the first page should provide the summary totals by programs.

Lines 1-4, Columns (c) through (g)

For new applications, leave Columns (c) and (d) blank. For each line entry in Columns (a) and (b), enter in Columns (e), (f), and (g) the appropriate amounts of funds needed to support the project for the first funding period (usually a year).

For continuing grant program applications, submit these forms before the end of each funding period as required by the grantor agency. Enter in Columns (c) and (d) the estimated amounts of funds which will remain unobligated at the end of the grant funding period only if the Federal grantor agency instructions provide for this. Otherwise, leave these columns blank. Enter in Columns (e) and (f) the amounts of funds needed for the upcoming period. The amount(s) in Column (g) should be the sum of amounts in Columns (e) and (f).

For supplemental grants and changes to existing grants, do not use Columns (c) and (d). Enter in Column (e) the amount of the increase or decrease of Federal funds and enter in Column (f) the amount of the increase or decrease of non-Federal funds. In Column (g) enter the new total budgeted amount (Federal and non-Federal) which includes the total previous authorized budgeted amounts plus or minus, as appropriate, the amounts shown in Columns (e) and (f). The amount(s) in Column (g) should not equal the sum of amounts in Columns (e) and (f).

Line 5–Show the totals for all columns used.

Section B. Budget Categories

In the column headings (1) through (4), enter the titles of the same programs, functions, and activities shown on Lines 1-4, Column (a), Section A. When additional sheets are prepared for Section A, provide similar column headings on each sheet. For each program, function or activity, fill in the total requirements for funds (both Federal and non-Federal) by object class categories.

Lines 6a-i–Show the totals of Lines 6a and 6h in each column.

Line 6j–Show the amount of indirect cost.

Line 6k–Enter the total of amounts on Lines 6i and 6j. For all applications for new grants and continuation grants the total amount in column (5), Line 6k, should be the same as the total amount shown in Section A, Column (g), Line 5. For supplemental grants and changes to grants, the total amount of the increase or decrease as shown in Columns (1)-(4), Line 6k should be the same as the sum of the amounts in Section A, Columns (e) and (f) on Line 5.

Line 7–Enter the estimated amount of income, if any, expected to be generated from this project. Do not add or subtract this amount from the total project amount. Show under the program.

narrative statement the nature and source of income. The estimated amount of program income may be considered by the federal grantor agency in determining the total amount of the grant

Section C. Non-Federal Resources

Lines 8-11--Enter amounts of non-Federal resources that will be used on the grant. If in-kind contributions are included, provide a brief explanation on a separate sheet.

Column (a) - Enter the program titles identical to Column (a), Section A. A breakdown by function or activity is not necessary.

Column (b) - Enter the contribution to be made by the applicant.

Column (c) - Enter the amount of the State's cash and in-kind contribution if the applicant is not a State or State agency. Applicants which are a State or State agencies should leave this column blank.

Column (d) - Enter the amount of cash and in-kind contributions to be made from all other sources.

Column (e) - Enter totals of Columns (b), (c), and (d).

Line 12--Enter the total for each of Columns (b)-(e). The amount in Column (e) should be equal to the amount on Line 5, Column (f) Section A.

Section D. Forecasted Cash Needs

Line 13--Enter the amount of cash needed by quarter from the grantor agency during the first year.

Line 14--Enter the amount of cash from all other sources needed by quarter during the first year.

Line 15--Enter the totals of amounts on Lines 13 and 14.

Section E. Budget Estimates of Federal Funds Needed for Balance of the Project.

Lines 16-19--Enter in Column (a) the same grant program titles shown in Column (a), Section A. A breakdown by function or activity is not necessary. For new applications and continuation grant applications, enter in the proper columns amounts of Federal funds which will be needed to complete the program or project over the succeeding funding period (usually in years). This section need not be completed for revisions (amendments, changes, or supplements) to funds for the current year of exisiting grants.

If more than four lines are needed to list the program titles, submit additional schedules as necessary.

Line 20--Enter the total for each of the Columns (b)-(e). When additional schedules are prepared for this Section, annotate accordingly and show the overall totals on this line.

Section F. Other Budget Information

Line 21--Use this space to explain amounts for individual direct object-class cost categories that may appear to be out of the ordinary or to explain the details as required by the Federal grantor agency.

Line 22--Enter the type of indirect rate (provisional, predetermined, final or fixed) that will be in effect during the funding period, the estimated amount of the base to which the rate is applied, and the total indirect expense.

Line 23--Provide any other explanations or comments deemed necessary.

I-018411

OMB Appro

ASSURANCES - NON-CONSTRUCTION PROGRAMS

LEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET.
END IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.

2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.

3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.

4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.

5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).

6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.

8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will co..ply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.

10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is $10,000 or more.

11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.

13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).

14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.

15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.

16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.

17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL	TITLE
	General Manager
APPLICANT ORGANIZATION	DATE SUBMITTED
Grassland Water District	4/16/99

Standard Form 424B (Rev. 7-97) Bac

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